

In the Claims

1. (Currently Amended) An optical cross-connect comprising:

- a plurality of input ports each operable to receive an optical input signal, each input signal comprising a plurality of channels that are each operable to carry optical traffic;
- a plurality of output ports each operable to output an optical output signal;
- a distributing amplifier associated with each input port, each distributing amplifier operable to generate a plurality of copies of the input signal received at the associated input port;
- a plurality of filter units each operable to:
 - receive a copy of one or more of the input signals from one or more of the distributing amplifiers; and
 - forward traffic in selected channels of one or more of the copies; and
- a combining amplifier associated with each output port, each combining amplifier operable to:
 - receive the traffic in one or more of the channels forwarded by one or more of the filter units; and
 - combine the received traffic into an output signal to be output from the associated output port;

the optical cross-connect further comprising:

- at least one upgrade input port and at least one upgrade output port expanding the capacity of the optical cross-connect;
- an upgrade distributing amplifier associated with the upgrade input port and an upgrade combining amplifier associated with the upgrade output port;
- a first upgrade filter unit operable to receive a plurality of copies of an input signal received at the upgrade input port, the first upgrade filter unit coupled to each of the combining amplifiers associated with the plurality of output ports and operable to forward traffic in selected channels of one or more of the copies to the combining amplifiers; and
- a second upgrade filter unit operable to receive a copy of one or more of the input signals from one or more of the distributing amplifiers associated with the plurality of input ports and to forward traffic in selected channels of one or more of the copies to the upgrade combining amplifier associated with the upgrade output port.

2. (Original) The optical cross-connect of Claim 1, wherein the distributing amplifiers each comprise a plurality of passive optical couplers operable to generate the plurality of copies of the associated input signal.

3. (Original) The optical cross-connect of Claim 1, wherein the combining amplifiers each comprise a plurality of passive optical couplers operable to combine the received traffic into the associated output signal.

4. (Original) The optical cross-connect of Claim 1, wherein the filter units are each operable to forward traffic in one or more selected channels by passing the traffic in selected channels and terminating the traffic in the remaining channels.

5. (Original) The optical cross-connect of Claim 1, wherein each filter unit comprises one or more filters, each filter operable to receive a copy of an input signal and to pass the traffic in selected channels and to terminate the traffic in the remaining channels of the particular input signal.

6. (Original) The optical cross-connect of Claim 5, wherein the filters comprise tunable filters.

7. (Original) The optical cross-connect of Claim 1, wherein a filter unit is associated with each output port.

8. (Original) The optical cross-connect of Claim 7, wherein a copy of each input signal is forwarded to each filter unit so that any channel of any input signal may be output from any output port.

9. (Original) The optical cross-connect of Claim 1, wherein the filter units are configured so that each combining amplifier receives only non-interfering channels from the filter units.

10. (Currently Amended) An optical cross-connect comprising:

- a plurality of input ports each operable to receive an optical input signal, each input signal comprising a plurality of channels that are each operable to carry optical traffic;
- a plurality of output ports each operable to output an optical output signal;
- a distributing amplifier associated with each input port, each distributing amplifier comprising a plurality of passive optical couplers operable to generate a plurality of copies of the input signal received at the associated input port;
- a plurality of filter units each comprising a plurality of filters, each filter operable to:
 - receive a copy of a particular input signal from a distributing amplifier;
 - forward the traffic in selected channels of the input signal; and
 - terminate the traffic in the remaining channels of the input signal; and
- a combining amplifier associated with each output port, each combining amplifier operable to receive the traffic in one or more of the channels forwarded by one or more of the filter units, each combining amplifier comprising a plurality of passive optical couplers operable to combine the received traffic into an output signal to be output from the associated output port;

the optical cross-connect further comprising:

- at least one upgrade input port and at least one upgrade output port expanding the capacity of the optical cross-connect;
- an upgrade distributing amplifier associated with the upgrade input port and an upgrade combining amplifier associated with the upgrade output port;
- a first upgrade filter unit operable to receive a plurality of copies of an input signal received at the upgrade input port, the first upgrade filter unit coupled to each of the combining amplifiers associated with the plurality of output ports and operable to forward traffic in selected channels of one or more of the copies to the combining amplifiers; and
- a second upgrade filter unit operable to receive a copy of one or more of the input signals from one or more of the distributing amplifiers associated with the plurality of input ports and to forward traffic in selected channels of one or more of the copies to the upgrade combining amplifier associated with the upgrade output port.

11. (Original) The optical cross-connect of Claim 10, wherein the filters comprise tunable filters.

12. (Original) The optical cross-connect of Claim 10, wherein a filter unit is associated with each output port.

13. (Original) The optical cross-connect of Claim 12, wherein a copy of each input signal is forwarded to each filter unit so that any channel of any input signal may be output from any output port.

14. (Original) The optical cross-connect of Claim 10, wherein the filter units are configured so that each combining amplifier receives only non-interfering channels from the filter units.

15. (Currently Amended) A method for cross-connecting optical signals, comprising:

receiving an optical input signal at each of a plurality of input ports, each input signal comprising a plurality of channels that are each operable to carry optical traffic;

generating a plurality of copies of each input signal;

receiving a copy of one or more of the input signals at each of a plurality of filter units;

forwarding traffic in selected channels of one or more of the copies received at each filter unit to one or more output ports;

receiving the traffic in one or more of the channels forwarded by one or more of the filter units at a plurality of output ports; and

combining the traffic received at each output port into an optical output signal to be output from the output port;

upgrading the optical cross-connect to further include:

at least one upgrade input port and at least one upgrade output port expanding the capacity of the optical cross-connect;

an upgrade distributing amplifier associated with the upgrade input port and an upgrade combining amplifier associated with the upgrade output port;

a first upgrade filter unit operable to receive a plurality of copies of an input signal received at the upgrade input port, the first upgrade filter unit coupled to each of the plurality of output ports and operable to forward traffic in selected channels of one or more of the copies to one or more of the output ports; and

a second upgrade filter unit operable to receive a copy of one or more of the input signals from one or more of the plurality of input ports and to forward traffic in selected channels of one or more of the copies to the upgrade combining amplifier associated with the upgrade output port.

16. (Original) The method of Claim 15, wherein the plurality of copies of each input signal are generated using a plurality of passive optical couplers.

17. (Original) The method of Claim 15, wherein the traffic received at each output port is combined using a plurality of passive optical couplers.

18. (Original) The method of Claim 15, wherein forwarding the traffic in one or more selected channels of a copy of an input optical signal comprises passing the traffic in selected channels of the signal and terminating the traffic in the remaining channels of the signal.

19. (Original) The method of Claim 15, wherein a filter unit is associated with each output port.

20. (Original) The method of Claim 19, wherein a copy of each input signal is forwarded to each filter unit so that any channel of any input signal may be output from any output port.

21. (Original) The method of Claim 15, wherein only non-interfering channels of different input signals are forwarded to a particular output port.

22. (Currently Amended) A method for cross-connecting optical signals, comprising:

receiving an optical input signal at each of a plurality of input ports, each input signal comprising a plurality of channels that are each operable to carry optical traffic;

generating a plurality of copies of each input signal using a plurality of passive optical couplers;

receiving a copy of one or more of the input signals at each of a plurality of filter units;

forwarding traffic in selected channels of one or more of the copies received at each filter unit to one or more output ports;

receiving the traffic in one or more of the channels forwarded by one or more of the filter units at a plurality of output ports; and

combining the traffic received at each output port into an optical output signal to be output from the output port using a plurality of passive optical couplers;

upgrading the optical cross-connect to further include:

at least one upgrade input port and at least one upgrade output port expanding the capacity of the optical cross-connect;

an upgrade distributing amplifier associated with the upgrade input port and an upgrade combining amplifier associated with the upgrade output port;

a first upgrade filter unit operable to receive a plurality of copies of an input signal received at the upgrade input port, the first upgrade filter unit coupled to each of the plurality of output ports and operable to forward traffic in selected channels of one or more of the copies to one or more of the output ports; and

a second upgrade filter unit operable to receive a copy of one or more of the input signals from one or more of the plurality of input ports and to forward traffic in selected channels of one or more of the copies to the upgrade combining amplifier associated with the upgrade output port.

23. (Original) The method of Claim 22, wherein forwarding the traffic in one or more selected channels of a copy of an input optical signal comprises passing the traffic in

selected channels of the signal and terminating the traffic in the remaining channels of the signal.

24. (Original) The method of Claim 22, wherein a filter unit is associated with each output port.

25. (Original) The method of Claim 24, wherein a copy of each input signal is forwarded to each filter unit so that any channel of any input signal may be output from any output port.

26. (Original) The method of Claim 22, wherein only non-interfering channels of different input signals are forwarded to a particular output port.

27. (Canceled)